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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/642,238

08/18/2003

Paolo Mola

3816-51

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08/14/2006

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EXAMINER

COMPTON, ERIC B

ART UNIT

PAPER NUMBER

3726

DATE MAILED: 08/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/642,238

Applicant(s)

MOLA, PAOLO

Examiner

Eric B. Compton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 16-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 16-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 14 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 14 (amended), line 2 recites "wherein said first tool comprises a blade". The Specification provides no support for a tool that is a blade. To the contrary the Figures show a rotating tool.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 14, and 16-17, are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0 992 310 A2 to Lowe (General Electric Co).

Regarding claim 1, Lowe discloses a method for production of a rotor (16) of a centrifugal compressor (see Col. 1, line 13), produced from a monolithic disc (10), and that the disc is worked in a radial direction by at least one tool (22) of a numerical control machine (20, see [0025] ("digitally programmable controller of the machine")), to remove shavings to produce radial cavities (30) in the rotor.

Regarding claims 2-3, see [0024]; Figure 1; claims 7-8.

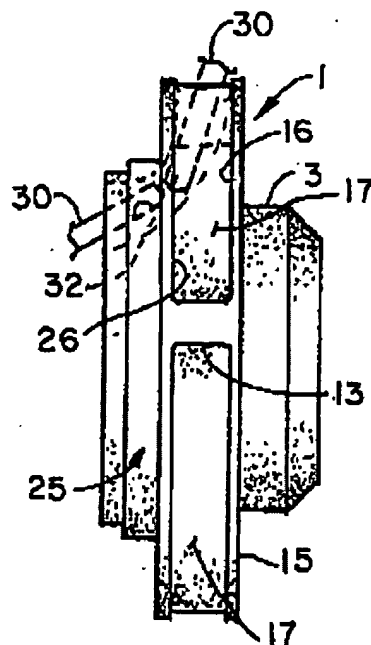
Regarding claims 13-14, see [0046].

Regarding claim 16, Lowe discloses pockets (30) are formed; see also [0040] (discussing step-milling).

Regarding claim 17, the numerically control machine has five controlled axes. See [0020].

5. Claims 1-5, 7-10, 15-17 and 20, are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. 5,438,755 to Giberson.

Regarding claim 1, Giberson discloses a method for production of a rotor (1) of a centrifugal compressor, produced from a monolithic disc (see Col. 3, line 38), and that the disc is worked in a radial direction by at least one tool (30) of a numerical control machine (see Col. 3, line 42), to remove shavings to produce radial cavities (16) in the rotor. See Figure 3, below:



Regarding claim 2-5, 7-10, and 15-17, the reference discloses:

In making the shrouded impeller 1, in this illustrative embodiment, a rough forged alloy steel blank is first turned and bored to the external profile of the impeller, approximately three percent (3%) oversize with respect to the finished impeller. Next, using a three dimensional CNC milling machine with conventional end mills, with ball end mills where appropriate, as much material as possible is removed from the passageways. The leading edge and trailing edge zones can usually be completed with this step, i.e., all material in the passageway in a direct line of sight from the outside diameter and from the eye is removed. A limitation to the depth of penetration in this step is the length to diameter dimension of the tools. Some material may be in the direct line of sight, but too deep to be efficiently removed in this step.

Col. 3, lines 37- 42; See *also* U.S. Pat. 4,579,705, Figures 7(b&d).

Regarding claims 13-14, see Col. 4, lines 3-5.

Regarding claim 20, the rotor is steel. See Col. 3, line 38.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lowe.

Lowe discloses the invention cited above, except for particulars claimed.

Regarding claim 20, it would have been obvious to one having ordinary skill in the art at the time of invention to have practiced the invention of Lowe by providing a steel blisk, in order to produce a rotor having sufficient tensile strength. See *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) (The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination).

8. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowe or Giberson in view of U.S. Pat. 6,354,780 to Davis et al.

Lowe and Giberson disclose the invention cited above, except for providing a heat treatment and balancing.

Davis discloses forming a rotor for a compressor by machining. The reference notes providing a heat treatment "to improve material properties," Col 9, lines 25-26, and subsequent balancing procedure to minimize imbalance.

Regarding claims 18-19, it would have been obvious to one having ordinary skill in the art at the time of invention to have practiced the invention of Lowe or Giberson by providing a heat treatment and subsequent balancing steps, in light of the teachings of Davis, in order to provide improved operating characteristic, e.g., strength and balance.

9. Claims 6 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giberson in view of U.S. Pat. 6,112,133 to Fishman.

Giberson discloses the invention cited above, except for simultaneous use of first and second tools.

Fishman discloses a configurable CNC machine for milling planar and curvilinear surfaces. The program seeks to optimize machine operations to increase efficiency. "A special synchronization entry allows the operator to schedule operations to avoid tool collision from machines with multiple simultaneously operating tool-holding turrets and multiple spindles. The latter allows simultaneous cutting of the material from both ends of the part." Col. 7, lines 27-30.

Regarding claims 6 and 11-12, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have practiced the invention of Giberson using simultaneous tools, and provided a system to avoid superposition of tools, in light of the teachings of Fishman, in order to increase efficiency.

Response to Arguments

10. Applicant's arguments filed June 6, 2006, have been considered but they are not found fully persuasive.

Applicant's arguments with respect to Wu have been found persuasive.

Therefore, the 102(b) rejections based on Wu have been withdrawn.

However, the Examiner cannot agree with Applicant's characterization of Giberson and Lowe. It is noted that Applicant agrees "Giberson discloses the application of tooling from two different radial directions." Response, page 7.

In Giberson, beginning at column 3, line 52, the cited passage discussed by Applicant on page 8 of the Response, appears to flow from the sentences immediately preceding it, as well as, the sentences following it. The reference discloses:

The leading edge and trailing edge zones **can usually be completed with this step, i.e., all material in the passageway in a direct line of sight from the outside diameter and from the eye is removed.** A limitation to the depth of penetration in this step is the length to diameter dimension of the tools. Some material **may be** in the direct line of sight, but too deep to be efficiently removed in this step.

Col. 3, lines 44-51 (emphasis added). Thus, the reference recognizes that it is only with respect to the depth of penetration of the tool, that material may remain, and by contrast, it clearly suggests that no additional material would have to be removed if the tools are properly dimensioned. Nonetheless, in the event that the material inside the cavity must be removed, the reference notes that it can be removed by forming a hole. As to the forming step the reference notes "A hole is then made through the central section which is to be the passageway, either by drilling, as indicated in FIG. 3, **or by milling** or electro-discharge machining, **or use of a small remotely driven rotating tool held in a curved tool holder as illustrated in FIG. 7,** or some

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combination of those methods.” *Id.* at lines 52-57 (emphasis add). Thus, the reference meets the limitation, “working each disc in a second radial direction by at least one other tool of a numeral control machine such as to remove shaving and thereby produce complete radial cavities,” as required for claim 1 (amended). In that case, the additional step of milling using the tool shown in FIG. 7 to remove material from the cavity, is working the with at least one other tool in a second radial direction from the first tool (30, left tool) of FIG. 3.

While Applicant focuses, on the statement, “In the preferred embodiment shown, it is made by drilling,” *Id.* at. Lines 52-53, disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. See *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971).

In Rowe, the reference notes “Referring initially to Figure 2, the step milling process is initiated by cutting an elongate groove 26 having an arcuate bottom to partially expose a sidewall 28 starting at the perimeter of the blank by feeding the rotating mill 22 transversely across the blank. The so exposed sidewall 28 is then cut by again feeding the mill 22 transversely across the blank along the previously cut groove 26. Then be alternately repeating the groove and sidewall cutting, **the groove is step milled radially deeper in the blank** and forms a corresponding pocket 30 along which the sidewall 28 extends.” [0024] (emphasis added). Later, the reference notes, “In the preferred embodiment, **a first end mill 22** is used to step mill the entire first pocket 30 until its two sidewalls 28 are finished machined. Then **a different second ball end mill**

22 of identical configuration is used to step mill the second pocket 30 completely to finish the two sidewalls thereof." [0041] (emphasis added). Claims 1-3 are recited broadly enough, such that the first and second radial directions need not necessarily be in opposite directions nor produce the same pocket. Cf. claim 4 ("wherein second tool works, starting from an inner diameter of said disc until it reaches said outer partial cavity.").

Lastly, Applicant is referred to Fishman, which discloses: "A special synchronization entry allows the operator to schedule operations to avoid tool collision from machines with multiple simultaneously operating tool-holding turrets and multiple spindles. *The latter allows simultaneous cutting of the material from both ends of the part.*" Col. 7, lines 27-30 (emphasis added). Clearly the prior art recognizes using multiple tools simultaneously to increase efficiency.

Applicant's use of two tools applied in two different radial directions, provides no new and/or unexpected results over the cited prior art, other than to increase efficiency, which the prior art clearly teaches and/or suggests.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

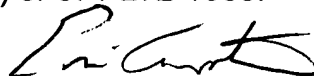
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Compton whose telephone number is (571) 272-4527. The examiner can normally be reached on M-F 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Bryant can be reached on (571) 272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Eric B. Compton
Primary Examiner
Art Unit 3726

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